HESS OIL VIRGIN ISLANDS CORP.

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1501 McKinney Street
Houston, Texas 77010

December 7, 2021

Mr. Adolph Everett, Chief
Hazardous Waste Programs Branch
US Environmental Protection Agency, Region 2
290 Broadway
New York, New York 10007-1866

Re: St. Croix Alumina Site Administrative Order Docket No. RCRA-0202001-7301
Response to November 1, 2021, EPA Comments to the Phase 1 Natural Source Zone Depletion Assessment Report
EPA Facility ID No. VID090302084

Dear Mr. Everett:

The Project Operating Committee (POC) has reviewed EPA's November 1, 2021, comments to the Phase 1 Natural Source Zone Depletion (NSZD) Assessment Report dated, September 30, 2021. The following responses address those comments. The POC will begin the Phase 2 scope of work upon EPA's approval.

Sincerely,

Brian Epperson
Remediation Manager

Cc: Mr. Ricardito Vargas (Electronic Copy)
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Land, Chemicals and Redevelopment Division
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December 7, 2021

Mr. Ricardito Vargas,
Project Manager
Land and Redevelopment Programs Branch,
Land, Chemicals and Redevelopment Division
USEPA Region 2
290 Broadway, 25th Floor
New York, NY 10007
212-637-3703 Office

Re: Response to Technical Review, Phase 1 Natural Source Zone Depletion Assessment Report, St. Croix, U.S. Virgin Islands, St. Croix Alumina Site, Dated September 2020. EPA ID Number VID090302084

Dear Mr. Vargas,

EHS Support has reviewed the *Technical Review, Phase 1 Natural Source Zone Depletion Assessment Report* for the St. Croix Alumina Site, St. Croix, U.S. Virgin Islands (hereafter 'Site'), and prepared the following responses to the comments. For ease of review the comments provided by the United States Environmental Protection Agency (USEPA) contractor have been provided and the responses are given in italics.

A conference call to discuss USEPA's comments was held on November 1st 2021 between the Project Operating Committee (POC), USEPA, and contractor consultants working for both parties. Alignment was reached in this meeting on an approach to expedite approval of the follow on Phase 2 work scope. Key agreements reached on the conference call included:

1. The establishment of additional DCC sampling locations adjacent to the well locations evaluated during the Phase 1 scope of work. This additional work was recommended by USEPA to enable comparison of estimated NSZD mass losses from the Phase 1 and Phase 2 scopes of work. In addition, based on USEPA comments additional DCC sampling locations will be completed immediately adjacent to the vertically discrete soil gas sampling locations.
2. The completion of additional DCC sampling locations upgradient of the LNAPL affected areas to facilitate definition of background conditions.
3. Agreement that the approach for the NSZD assessment is iterative and that future supplemental work may be required using E-Flux or other methods at discrete locations of the plume.
4. Agreement that future long term monitoring data may be required at discrete locations of the plume to support the adoption of NSZD in all LNAPL-affected areas.
5. Agreement that none of the comments provided precluded execution of the Phase 2 scope of work with EHS Support to provide a revised DCC sampling location map (addressing items 1 and 2 above) which also shows the locations of the vertical soil gas sampling locations.

Consistent with framework provided in the NSZD workplan, the purpose of the Phase 1 report was to quickly convey information to USEPA to enable determination of the approach to be used in execution of the Phase 2 scope of work. The results and assessment contained in the Phase 1 report will be incorporated into the Phase 2 report and comments from USEPA (and associated responses) provided below will be incorporated into this report.

We look forward to advancing the Phase 2 assessments so that management of light non-aqueous phase liquid (LNAPL) mobility/recoverability and remedial actions can be developed with the ultimate goal of achieving restoration of groundwater quality.

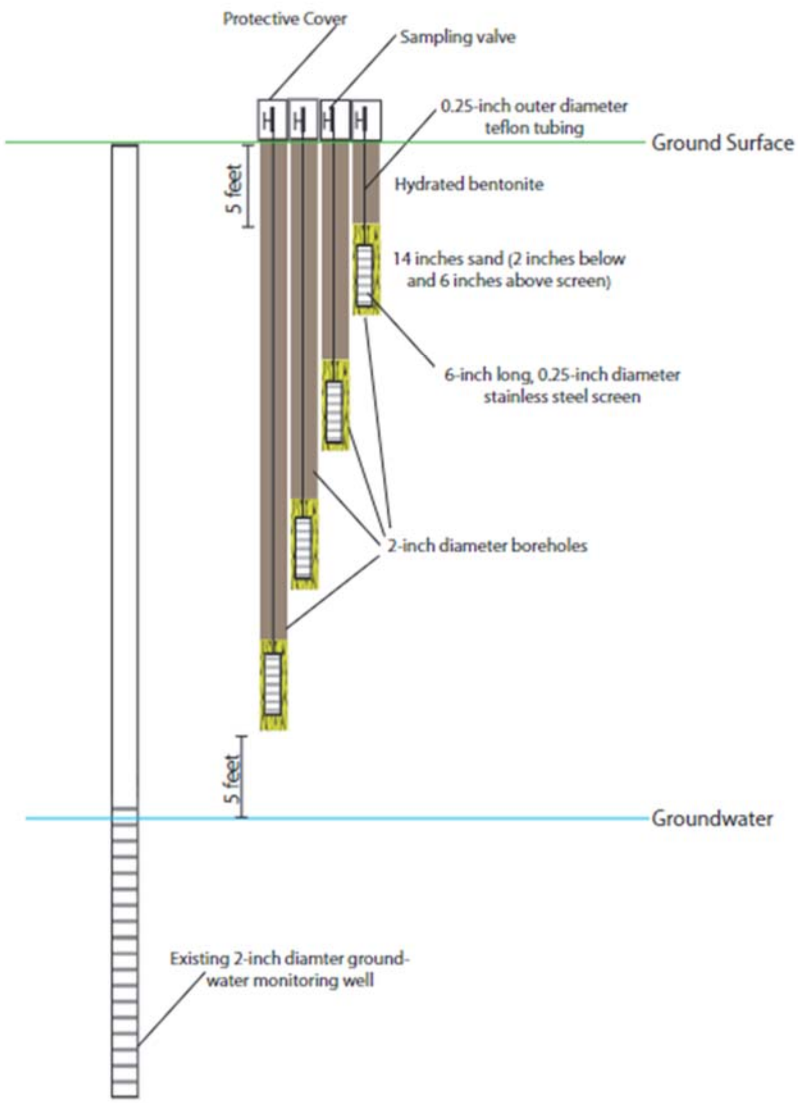
General Comment 1*:* The presence of methane in soil gas from well headspace near the groundwater surface may not be representative of gas compositions in the near surface of the site at the top of the vadose zone as noted in EPA's previous comments on the LNAPL Natural Source Zone Depletion Work Plan. St. Croix Alumina Site, St. Croix, dated April 2021 (Work Plan). This is because of the longer residence times in the vadose zone for methane gas to be exposed to oxidation. Well casings, as opposed to natural conditions, are open conduits for the travel of methane to near the surface. As such, the Phase 2 scope of work needs to use Dynamic Closed Chamber (DCC) methods to verify the presence of methane in surface soil gas and to identify key locations for further study. The DCC method using a more extensive grid sampling approach is commonly used as a screening method at sites followed by the use of more definitive methods like E-Flux and/or some periodic monitoring events using DDC and soil gas probes at key locations over a more extended period of time. Once key monitoring locations are identified E-Flux can provide time weighted results over weeks and results directly corrected for atmospheric carbon influences (Bioremediation and Sustainable Environmental Technologies, May 2017 by R. Ahlers, A. Pennington, J. Zimbron, C. Jones "Field Comparison of Two CO2 Sorbent Trap Methods and Dynamic Closed Chamber Method for Soil Flux Measurement."). The use of gradient methods that use soil gas probes installed at multiple depth intervals may also need to be considered where significant portions of the site are covered by concrete or heavy vegetation.

Also, thermal methods using temperature, and DCC, E-Flux, and soil gas probe methods, are usually conducted over a year or more, unlike the data from the Phase 1 Natural Source Zone Depletion Assessment Report, for the St. Croix Alumina Site, St. Croix, U.S. Virgin Islands, dated September 2021 (Phase 1 Report). As such, it is premature to assume the adequacy of using solely DCC methods to estimate NSZD rates for the site. An initial screening of the site using soil gas probes and DCC measurements are needed to confirm changes in soil gas characteristics beneath the site and the presence or absence of methane in near surface soil gas and the potential impacts from areas covered by concrete or heavy vegetation. Following the screening level assessment, preferred methods will need to be identified for conducting some longer term measurements or more frequent measurement at select locations to confirm the consistency of results.

Finally, the Phase 1 Report data does indicate that methane may create a low bias in results collected using the E-flux method, but the amount of expected bias is not quantifiable based on the Phase 1 results. In Ground Water Monitoring and Remediation (June, 2020), P.R. Kulkarni, C.J. Newell, D.C King, L.J. Molofsky, and S. Garg demonstrate in their paper "Application of Four Measurement Techniques to Understand Natural Source Zone Depletion Processes at an LNAPL Site" how these various methods including thermal and chemical methods were compared and used at a former refinery to verify expected NSZD rates. Gradient methods were also considered to quantify the influence of advective flow as compared with diffusive dispersion. As noted by many authors thermal methods using temperature are usually conducted in periodic events conducted over at least a year. The Phase 2 scope of work should include tests where in multiple methods for estimating NSZD can be compared to confirm that the estimated NSZD rates at a site are reasonable.

Response to General Comment 1: *Responses to each point raised in General Comment 1 are parse into bullets for ease of review. We note that points raised in General Comment 1 align with the approach proposed for Phase 2 works in the* **Phase 1 Natural Source Zone Depletion Assessment Report***.*

- *We acknowledge that well soil gas readings at depth and 2 feet below casing are not likely representative of shallow soil conditions. The data were simply collected to understand the spatial variability in soil gas concentrations across the site and demonstrate (via an abundance of carbon dioxide and methane in the subsurface) that robust NSZD was occurring. The inherent potential for atmospheric air dilution of soil gas readings at 2 feet below top of casing was also the reason gas readings from just below top of casing were not included in figures and assessment of NSZD conditions.*
- *We agree that dynamic closed chamber (DCC) measurements of soil gas flux at ground surface using a LI-COR meter is the logical next step in quantifying surface gas flux. This is recommended due to the nature of site soils that potentially allow for both carbon dioxide and methane flux to ground surface, which can be quantified by the DCC method but not the passive trap method.*
- *We agree that gas gradient methods provide a line of evidence to support data collected from a DCC assessment during Phase 2 works. For this reason, four locations of nested (multi-level) soil gas probes adjacent to existing monitoring wells were proposed for incorporation into the Phase 2 program of works (see Figure provided as **Attachment B** and design schematic below).*
- *We believe that passive trap deployment for time-weighted assessment of NSZD rates is premature at this stage until methane flux to ground surface is quantified using the DCC method. Given the passive trap method does not account for methane flux, it may not be the appropriate means for assessing NSZD rates. We note that DCC instruments may be deployed for extended periods of time to determine time-weighted gas flux and provide information on diurnal changes at a resolution not possible using passive traps. Consistent with the conference call referenced above, the assessment process is iterative and the need for and scope of supplemental (including E-Flux methods) for more long term assessments will be determined based on the Phase 2 results.*
- *We note that sites where long-term deployment of NSZD assessments are conducted are typically in arid/desert or midwestern areas where there are substantial diurnal or seasonal temperature extremes. The stable tropical climate of the site will be a key factor in determining the need or duration of alternative methods to establish NSZD rates. We note that Kulkarni et al. (2020) evaluated a site located in Southern California, where temperature typically varies from 48 to 85 F annually. At St. Croix, annual temperature variations are typically in a narrow range between 73 to 88 F and tidal fluctuations are small.*



Gas gradient well design schematic

General Comment 2*:* Thermal estimates presented in the Phase 1 Report are based on non-site-specific aquifer and other data from more rounds of sampling. A focused study based on an initial DCC screen and surface soil gas probes are needed to verify the representativeness of the Phase 1 measurements and to perform a targeted assessment using alternative methods such as E-flux, additional DCC studies, gradient soil gas probes, and additional temperature data to confirm the reliability of any final decisions concerning NSZD rates.

Review of the Phase 1 soil gas results indicates that the presence of measurable amounts of methane might result in a low bias for E-flux results, but a side-by-side comparison of alternative NSZD method measurements and the degree of potential bias are still needed. If DCC is shown to be the preferred method, the Project Operating Committee (POC) may also want to consider using a barium carbonate method for distinguishing atmospheric as opposed to hydrocarbon degradation related carbon dioxide (CO2). The method is discussed in American Petroleum Industry (2005), "A practical strategy for assessing the subsurface vapor-to-indoor air migration pathway at petroleum hydrocarbon sites," Regulatory Analysis and Scientific Affairs. Publication number 4741(51). Please modify the Phase 2 scope of work to include the use of multiple methods for estimating NSZD rates and additional rounds of data collection as suggested in Figure 1-1 of the Phase 1 Report.

Response to General Comment 2: *We acknowledge that Phase 1 works were performed to provide qualitative evidence for NSZD rates. Given the data were amenable for estimating preliminary NSZD rates, these calculations were performed and included. We concur that DCC methods are a logical step for Phase 2 works, and the recommendations for the Phase 2 work included a flexible/adaptive plan using DCC methods. As outlined in the Phase 1 report, four multi-depth soil gas monitoring wells will be installed and soil gas readings made to estimate mass losses using Ficks First Law of Diffusion. This will provide an additional line of evidence that will be discussed in the Phase 2 report.*

We note that atmospheric CO_2 is present at concentrations of 0.04% compared to well headspace readings generally in the 10 to 15% range 2 feet above groundwater at source area wells. Background DCC locations are also incorporated into the DCC deployment plan to account for non-hydrocarbon contributions to measured gas fluxes. Results from these locations will be subtracted from source area wells and will address background soil and atmospheric influences. For this reason, we do not believe use of the 'barium carbonate' method is warranted. We also note that the API 2005 does not describe the barium carbonate method mentioned above, which we assume is the gravimetric method that measures barium carbonate precipitated from CO_2 fluxed through a barium chloride solution.

Specific Comment 1: Cover Letter: In this cover letter, the POC suggests that agreement is needed on one method for measuring soil gas for the purposes of estimating NSZD depletion rates. It is also noted that agreement on a final grid pattern for collection of this data is needed based on the Phase 1 results. However, data provided by the Phase 1 program is insufficient to select one or another of the DCC, E-Flux, or other soil gas measurement methods to be used to estimate NSZD rates. It is suggested that the final grid pattern for use at the site should be a dynamic planning effort. An initial grid could be placed over the site and DCC measurements made to confirm Phase 1 assumptions concerning the presence or absence of methane in surface soil gas. Select key locations need to be identified where alternative methods such as E-Flux can be used to estimate and compare results to confirm expected NSZD rates to assure comparability and reliability of NSZD rates estimated for the site. The POC should also consider the use of some limited soil gas probe samples collected using canisters that are collocated with DCC and E-Flux locations to confirm the DCC instrument and or E-flux methods are providing reliable results. Include this information in the Phase 2 scope of work or provide a rationale for another approach.

Response to Specific Comment 1:

As discussed in the 11/1/2021 call with the EPA contractor, the DCC grid will be modified to include DCC locations adjacent to existing monitoring wells, where not prohibited by pavement. The results of the Phase 2 DCC study will be used to determine the need for additional focused DCC measurements or deployment of passive traps.

Specific Comment 2: Section 3 and Table 1: This table shows concentrations of methane collected from source area well from two feet below casing are dramatically lower as compared to concentrations measured at one foot above the groundwater table. Concentrations two feet below the casing are one percent (1%) by volume or less throughout the source area and are not mapped in the figures provided. Near surface soil gas methane concentrations are likely to be even less when measured using DCC or another appropriate soil gas probe measurement techniques. Because near surface measurements in wells are much lower than those taken just above the water table it is very likely that measurements measured at the surface using DCC will be even lower and may not introduce significant negative bias due to the presence of methane. E-Flux is the most desirable method for obtaining time weighted average concentrations and to make atmospheric CO2 corrections, particularly considering that a barium carbonate method for making atmospheric CO2 contributions is not proposed in the Phase 2 scope of work at this point in time. Please revise the Phase 2 scope of work to include focused E-Flux locations, along with DCC and soil gas probes, as appropriate.

Response to Specific Comment 2: *Gas concentrations 2 feet below surface in the headspace of the well are likely affected by atmospheric gas entrainment into the well casing. These data points are not adequate to determine that passive traps are the preferred data collection method without verification that methane seepage is not occurring at ground surface. The inability of E-Flux methods to quantify methane fluxes can result in significant underestimation of mass losses and the need for supplemental E-Flux assessments (at discrete locations) will be determined after completion of the Phase 2 scope of work.*

***Specific Comment 3**:* Section 4, Page 7: The data quality assessment provided as Appendix D and E are laboratory generated reports that do not consider all of the data review methods needed to demonstrate the precision, accuracy, representativeness, completeness, and comparability (PARCC) of results provided in the results report. Much of the data needed to perform an adequate PARCC analysis is provided in the text of the results report, but it is not summarized as appropriate in the Phase 1 Report and secondary data use qualifiers have not been applied by the project team outside the laboratory where needed to compare with data use goals stipulated in the project QAPP. Update the Phase 1 Report to address this issue.

Response to Specific Comment 3: *The Tier II Data Quality Evaluation Report and the Usability Data Quality Evaluation that make up Appendices D and E of Phase 1 Natural Source Zone Depletion Assessment Report September 2021 (St. Croix Alumina Phase 1 NSZD Report) are not laboratory-generated reports. They are data validation reports written by a project chemist. Data usability evaluations were created with the stated premise that results are deemed either usable as they are -or- not usable. Those that are not usable are rejected. This is presented in section 1.1 "Guidelines and Qualifiers" of each usability report:*

> *Results were evaluated to determine usability. Quality control (QC) elements that were reviewed, as well as applied acceptance limits, are presented in the following sections. Sample results that are deemed unusable due to significant QC exceedances have been rejected (definition below). All other reported results are considered usable. Some of these usable results are associated with QC variances that indicate uncertainty in the quantitative values but do not impact data usability. Limits applied during this review were established based on limits in United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines (Organic, January 2017), laboratory analytical methods, and professional judgment.*

> *Definition of R (Rejected) Qualifier - The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.*

With this in mind, the following logic is presented in Tier II validation reports:

> *In accordance with the site-specific Quality Assurance Project Plan (QAPP; EHS Support, 2021), results in the database will not reflect qualifiers applied during validation. The following excerpt is taken the QAPP and provides additional information.*
>
> *"Tier II validation will be performed on a small percentage of the data and is meant to provide*
>
> *information about the usability and quality of the data set as a whole. The majority of data (90 percent) that will undergo data usability review will not bear any validation qualifiers; those results will be used as-reported unless they need to be rejected. Therefore, in order to maintain consistency in the database, validation qualifiers applied during Tier II validation will not be applied to the data in the database or in the project tables/ reports."*

However, it should be noted that any validation qualifiers warranted by QC variances are presented in Tier II validation reports. In this data set, EHS Validation Report Number: 379 for Sample Delivery Group HS21070773 Section 4.3, <u>Total Petroleum Hydrocarbons: Diesel Range Organics (DRO) Analysis – Surrogates</u> presents the fact that, in the samples listed there, the recovery of surrogate 2-fluorobiphenyl was greater than the upper acceptance limit. It goes on to say that DRO results in those specified samples are consequently considered estimated and qualified with J flags.

Specific Comment 4*:* Section 5.1, Page 10: It is noted in the second and last bullet that some of the sample data for the samples from well VW25 and VW29 are unusable. These and other results with charge balances greater that 10 percent need to be qualified as unusable throughout this results report and future results reports as part of the PARCC analysis. Duplicate samples also need to be compared in the PARCC analysis and duplicates using different methods for estimating NSZD also need to be compared as part of the overall data quality and results evaluation.

Response to Specific Comment #4*. Comment is noted and data from samples VW25 and VW29 will be qualified. It is noted that while charge imbalances greater than 10 percent are generally qualified as unusable in many cases practitioners will allow charge imbalances of up to 20 percent for more qualitative assessments.*

Duplicate samples and associated RPD's will also be further discussed in the report. Further consistent with USEPA's comments the results of the various NSZD calculations will also be discussed in the Phase 2 report.

Specific Comment 5: Section 5.2, Page 11 and Figures 2, 4 and 5-3: A reference piper plot showing the general ranges in values for various water types discussed in this section is needed to comparison purposes. Also, background wells need to be clearly identified on Figures 2 and 5-3. Finally, many of the supposed down gradient wells shown in Figure 2 appear to be in the source area based on the light non-aqueous phase liquid (LNAPL) thickness plot provided in Figure 4. Please provide an explanation as to why these wells are considered down gradient when they appear to be in the LNAPL plume.

Response to Specific Comment 5: *Comment is noted and the report will include a reference piper plot to guide the reader and clear labelling of background wells. It was also discussed on the conference call that EHS Support would include additional text on the criteria used for selection of background, source and downgradient wells for the purposes of this assessment and general discussion of NSZD results.*

The criteria for selecting upgradient wells are those located hydraulically up- or side-gradient to the LNAPL plume. Source area wells are those that have measured LNAPL. Downgradient wells are those that are immediately adjacent to the LNAPL affected area or hydraulically downgradient. Whereas these areas are generally consistent, some designations may change between monitoring events. The figure has been updated to reflect the July 2021 area designations as requested. Figure 2 has been updated and provided as ***Attachment A****.*

Specific Comment 6: Section 6.1, Page 15: The 2nd to last paragraph, 2nd sentence, implies that the type of surface cover such as vegetation and paved areas does not impact reported results for NSZD parameters. This may be true since wells were used to collect samples, but this will not be true when using DCC or other soil gas probes. Ensure the proposed grid for collection of NSZD parameters includes paved or linear capped portions of the site and appropriate methods (soil gas probes) during Phase 2 activities.

Response to Specific Comment 6: *Comment is noted. The scope of work as provided includes both DCC methods for unpaved areas of the site and vertical soil gas probes for paved areas of the site. Four vertically discrete soil gas sampling locations have been proposed for the site (see Attachment A) and if additional unpaved areas (or disturbed areas) are identified while on-site then LICOR sampling will be conducted in these areas. For areas where coarse aggregate is present at ground surface (for example disturbed areas near infrastructure) these materials will be manually removed to facilitate better mating between the DCC collar and the subsurface (prevent leakage and inherent low bias in readings).*

Specific Comment 7: Section 7.1.3, Page 30: This section states that computed results are in the range of measured values, but in most cases the calculated values are below the observed values. This would suggest, that the calculated NSZD rates are underestimations of the actual rates. Please provide a better explanation of why the calculated NSZD rates estimated can be assumed to be valid in future reports.

Response to Specific Comment 7*: Comment is noted and this discussion will be included in the Phase 2 report. Please note that range of computed CO_2 changes (33 to 62 mg/L) is in the range of observed changes (29 to 165 mg/L). The range of computed alkalinity changes (75 to 123 mg/L) is within the range of observed alkalinity changes (-9 to 394 mg/L). Also, the computed changes are the same order of magnitude as the observed changes, providing added confidence that CO2 and alkalinity systematics are likely governed by NSZD processes. We acknowledge the word 'changes' is missing in the final paragraph of this section and that minor revisions can be made to the text for clarity in the phase 2 report.*

Specific Comment 8*:* Section 7.3, Page 32: It is noted the differential temperature method as described by CRC CARE (2018) assumes that soils are homogeneous and isotropic. These conditions are not met at the site. In the second sentence it is suggested that complications may require parceling based on the geology in distinct areas. The temperature-based methods have assumptions that require the use of non-site specific data and other data manipulations. While the temperature NSZD rate estimation methods provide some qualitative data concerning NSZD rates, it is preferred to see multiples lines of evidence and fewer interpretive steps used when calculating estimated NSZD rates at the site. Please address this in NSZD calculations in the Phase 2 program.

Response to Specific Comment #8*. Comment is noted and will be addressed in the Phase 2 report.*

Specific Comment 9*:* Section 7.3, Page 33: The second bullet point notes that a number of wells, including VW4, VW6, VW7, VW13B, and VW-18, have negative temperature gradients and gradients were not calculated but assumed from neighboring polygons. The supposed negative gradients are explained because of pumping or substantial temperature excursions. Because no more pumping of groundwater is proposed in this area, temperature gradients should not be impacted in future monitoring events. Please address this in future monitoring and NSZD reporting.

Response to Specific Comment 9: *The comment is noted and future monitoring of these wells will be conducted after termination of groundwater pumping at VW13B (and with sufficient time for a new equilibrium to be established).*

Specific Comment 10: Section 8, Table 8-1, Page 35: In this table key study questions and results are summarized. Under the Soil Gas Flux Assessment topic, it is suggested that if statistically insignificant differences in gas concentration at multiple adjacent wells are identified, it is suggested that geology has little influence on calculated NSZD rates. This conclusion is unclear and unsubstantiated with the results provided in Phase 1 Report. Surface geology needs to be underlain on the near surface NSZD gas measurement points and the data evaluated before it can be concluded that geology has little or no impact on any NSZD rate calculations. Given that 20 or more measurements can be made in a day using the DCC method, results can and should be evaluated on an ongoing basis so that the proposed grid can be adjusted during implementation as necessary. Once more or less homogeneous areas are identified testing of time weighted methods such as E-Flux should be further evaluated and compared with DCC results as appropriate. Revise the Phase 2 sampling approach to address this issue.

Response to Specific Comment 10: *It is agreed that the DCC method as proposed will provide significantly more data to enable assessment of geologic effects on NSZD rates. As part of the Phase 2 reporting, the inferred geologic conditions will be overlayed with the measured mass fluxes (and associated mass losses) to support further assessment of geologic effects.*

Specific Comment 11: Section 8, Table 8-1, Page 35: As already noted in other comments, we disagree that methane may unacceptably bias E-Flux measurements taken at the site until more data from soil gas probes and the DCC and E-Flux methods are deployed, and the data compared. Revise the Phase 2 scope of work to address this issue.

Response to Specific Comment 11: *Comment is noted and this statement will be re-evaluated upon receipt of the DCC and vertically discrete soil gas data. Inherently if high methane fluxes are observed at near surface (not being degraded to carbon dioxide) then methods such as E-Flux (which only quantifies carbon dioxide mass losses) will be biased low.*

Specific Comment 12: Section 8, Table 8-1, Page 36: As already noted, more rounds of sampling are needed to evaluate NSZD rates and more than DCC methods are needed during the Phase 2 scope of work. Revise the Phase 2 scope of work to address this issue.

Response to Specific Comment 12: *As discussed on the conference call, DCC methods and vertically discrete soil gas probes will be used to further assess NSZD rates as part of the Phase 2 scope of work. The need for further assessments including longer term testing (including use of the E-Flux method) will be determined based on analysis of this data. Other long term monitoring alternatives include long term studies using DCC approaches and the establishment of long term temperature monitoring infrastructure (strings of temperature buttons) in wells.*

Specific Comment 13: Section 8, Table 8-1, Page 37: It is unclear if adequate background wells have been identified. Additional measurement of potential impacts from atmospheric CO2 using E-Flux and or the Barium carbonate method are needed before it can be concluded that results are representative of influx from NSZD reactions. Revise the Phase 2 scope of work to address this issue

Response to Specific Comment 13: *As noted above, additional background DCC locations have been added to the proposed sampling program. Given that the DCC method comprises a systematic program of testing comparison of background to source area concentrations will allow elimination of both natural and atmospheric sources of methane and carbon dioxide. A revised Figure 11 is provided as* ***Attachment B*** *showing additional DCC deployment locations and indicating proposed soil gas gradient well locations.*

Specific Comment 14: Section 8, Table 8-1, Page 38: There does not appear to be conclusive data to decide that the calculated results are biased low because of methane readings at one foot above the water table. Near surface readings in well annuluses below casing are significantly lower than those immediately above the groundwater at the site. Complete digestion or at least substantial oxidation of methane has not been demonstrated to potentially add any significant level of bias to the calculated results. Multiple lines of evidence for calculating NSZD rates are needed during Phase 2 at the site along with additional temperature and geochemical analyses to confirm the reliability of any NSZD rates proposed for use for management of the site.

Response to Specific Comment 14: *Comment noted. The Phase 2 program of works and Phase 2 Report will provide a detailed assessment of potential biases and recommendations for potential supplemental assessments (as required).*

Specific Comment 15: The grid proposed for collection of DCC data is too widespread and misses many of the expected hot spots. In addition, sample locations do not twin many of the wells where data was collected during Phase 1. A tighter grid located primarily near the best producing wells at the site are needed to assess NSZD. In addition, much of the site is paved or highly vegetated and may be better suited for soil gas probes. Please revise the Phase 2 scope of work to include use of a dynamic work plan approach and multiple soil gas measurement flux methods and probes for comparison purposes.

Response to Specific Comment 15: *The sampling grid has been revised to incorporate additional DCC sampling locations adjacent to wells and includes additional background sampling locations, and is provided as* ***Attachment B****. As noted in the Phase 1 report, additional sampling locations will be included at locations to be determined in the field. This will be based on (a) opportunities to access additional* *unpaved or disturbed areas (b) DCC results that warrant further step out locations (c) clearing activities associated with the proposed soil gas probe installation activities.*

The need for additional sampling will be determined based on the results of the Phase 2 program of works.

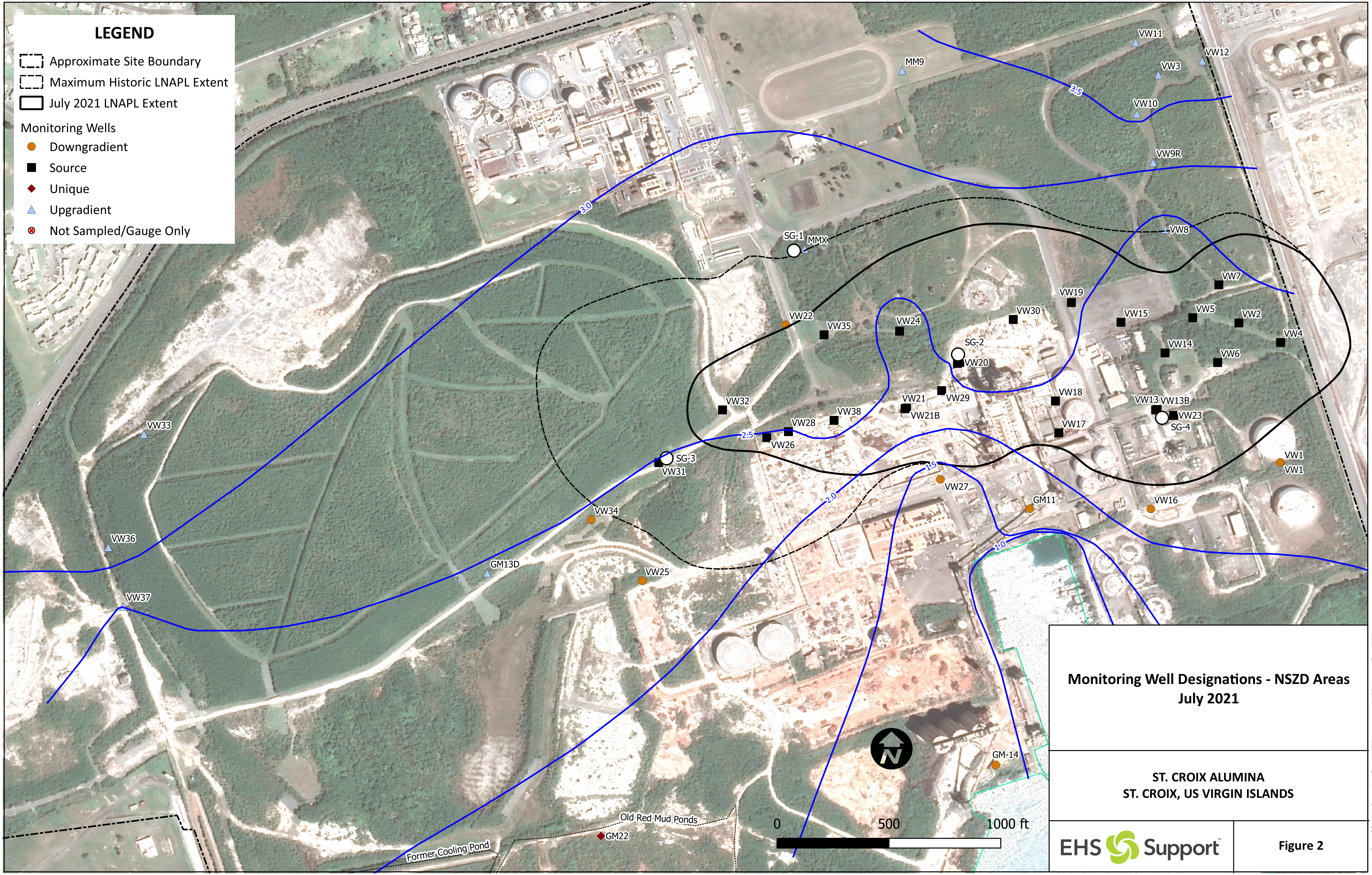
Sincerely,
EHS Support Corporation

Respectfully,

Nigel Goulding
Senior Vice President

Dr. Andrew Fowler
Senior Hydrogeologist

Attachment A – Revised Figure 2



Monitoring Well Designations - NSZD Areas
July 2021

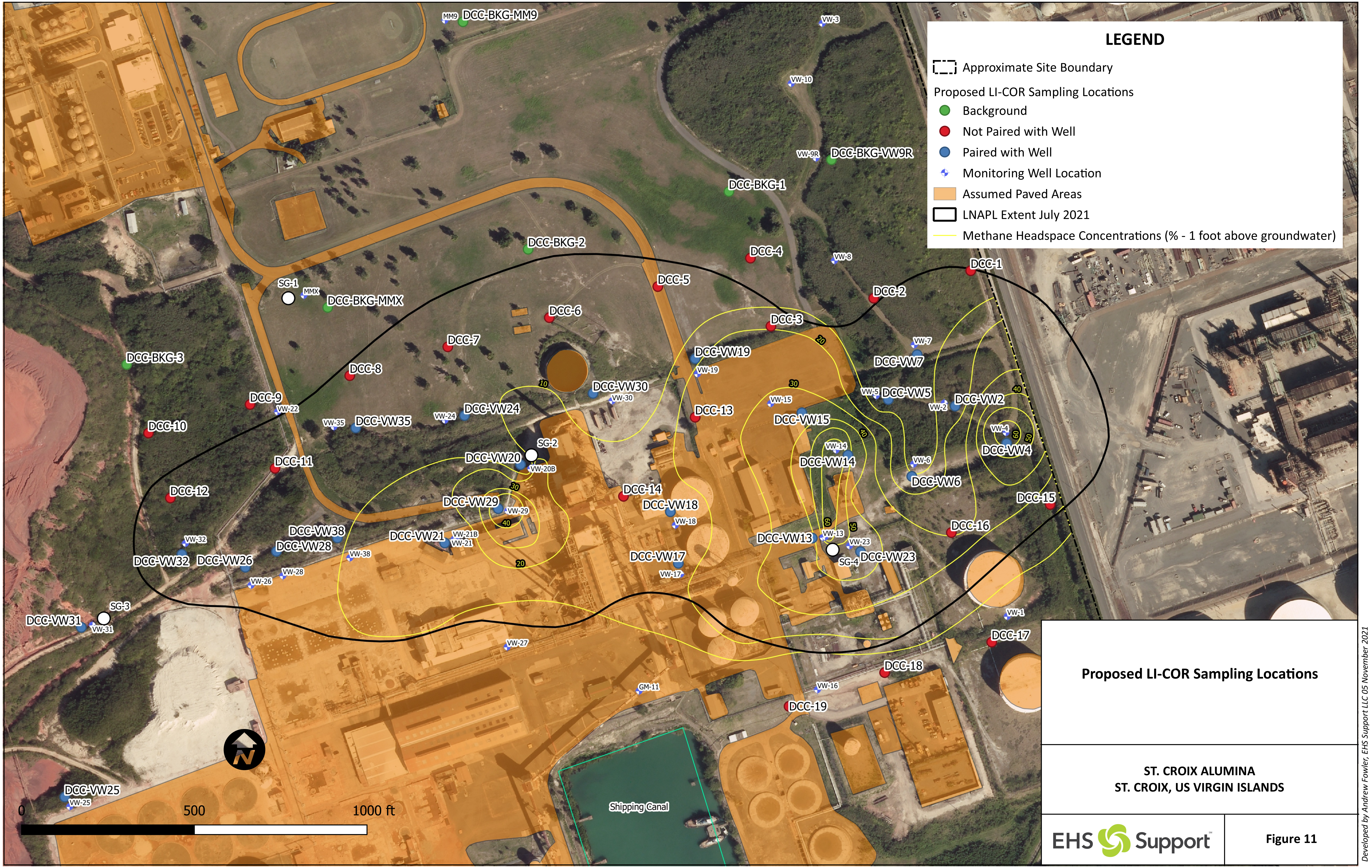
ST. CROIX ALUMINA
ST. CROIX, US VIRGIN ISLANDS

EHS Support

Figure 2

Developed by Andrew Fowler, EHS Support LLC. 05 November 2021

Attachment B – Revised Figure 11


LEGEND
Approximate Site Boundary
Proposed LI-COR Sampling Locations
Background
Not Paired with Well
Paired with Well
Monitoring Well Location
Assumed Paved Areas
LNAPL Extent July 2021
Methane Headspace Concentrations (% - 1 foot above groundwater)
DCC-BKG-MM9
MM9
VW-3
VW-10
VW-9R
DCC-BKG-VW9R
DCC-BKG-1
DCC-BKG-2
DCC-4
VW-8
DCC-1
DCC-5
DCC-2
SG-1
MMX
DCC-BKG-MMX
DCC-6
DCC-3
DCC-7
DCC-VW19
VW-19
VW-7
DCC-VW7
DCC-BKG-3
DCC-8
DCC-VW30
VW-30
VW-15
VW-5
DCC-VW5
VW-2
DCC-VW2
DCC-9
VW-22
DCC-13
DCC-VW24
VW-24
VW-35
DCC-VW35
DCC-VW15
DCC-10
VW-4
DCC-VW4
SG-2
VW-14
DCC-VW20
VW-20B
DCC-VW14
DCC-11
VW-6
DCC-VW6
DCC-12
DCC-14
DCC-15
DCC-VW29
VW-29
DCC-VW18
VW-18
DCC-16
DCC-VW38
DCC-VW21
VW-21B
VW-21
DCC-VW13
VW-13
VW-23
DCC-VW23
VW-32
DCC-VW28
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SG-4
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DCC-VW26
DCC-VW17
VW-17
VW-28
VW-26
SG-3
DCC-VW31
VW-31
VW-1
DCC-17
VW-27
DCC-18
GM-11
VW-16
DCC-19
10
20
30
40
50
60
DCC-VW25
VW-25
0
500
1000 ft
Shipping Canal
Proposed LI-COR Sampling Locations
ST. CROIX ALUMINA
ST. CROIX, US VIRGIN ISLANDS
EHS Support
Figure 11
Developed by Andrew Fowler, EHS Support LLC 05 November 2021